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ABSTRACT

This paper provides an exploration of the impact of the increasing use of microcomputers in education upon curriculum development and the physical space needs in the learning environment. A secondary topic is the present and future directions of schools in the design of computer environments. (Author/MD)

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Impact of the Microcomputer on the Physical Environment for learning

by

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ABSTRACT

Impact of increasing use of microcomputers in education upon curriculum development and the physical plant and present and future directions of schools in designing computer environments are explored.

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The increase in microcomputers in the schools has affected the need for variable space to accommodate the new instructional tool. As indicated in the most recent NSF Commission Report (National Commission on Science, Mathematics and Technology) and the Carnegie Foundation Reprot (H.S.: A Report on Secondary Schools in America), the insistent demands from technology, industry, and the business world will effect changes in school curriculum and the school facility.

The increased presence of microcomputers will tend to affect curriculum in the following patterns: (1) the individual learning environment and (2) group learning environments. The individual environment is involved primarily at the elementary and middle school levels. This includes the use of learning centers where one or two students use the microcomputer in a study carrel for remediation, supplemental, or reinforcement learning. Teachers are learning to prescribe drill and practice and discovery programs with a rotating schedule. Some of these in classrooms or library/media centers are movable spaces on tables with wheels. They need to be located away from heat, cold, and dust from chalkboards, and

accessible to electrical power hookups to prevent sudden or fluctuating surges. Such centers will require flexible use of space in classroom facilities with secure storage space for hardware and software.

The second and most dominant learning environment for usage of microcomputers is the large group learning environment. This is taking place mostly at the high schools, junior colleges, and universities but will also involve pilot elementary and middle schools mainly to teach literacy and programming skills. A networking system connecting together 16 to 30 terminals functions off a host computer which provides instructions for each terminal. This setup requires a large amount of space in one room in a circle or square format. It could also be set up in two or three adjacent rooms. The circle or square is often used as it maintains the class group for total instruction. Some space could be allotted to function with separate or individual instruction on one or two microcomputers. Individual computers can also be connected by cable in offices for monitoring or individual instruction.

Separate networks are being established in some schools for programming purposes and other smaller units (four to eight) in a network for special purposes, such as wordprocessing, with printers attached. Here the student

could receive instruction from the host mini- or microcomputer, allowing him or her to interact via the keyboard and proceed through various learning sequences, Possibly working independently on various assisted instruction materials, the student could meet the standards of the criterion-referenced procedure and then advance to the next level. The system could collect data on each student's progress, thus acting as a management system as well. A hard disk drive system could be used as storage in the host terminal and could also be shared between different schools within a district or regions of the United States. Also, a modem could be attached to the host system to retrieve or send data or receive various programs between schools. This could provide a wide range of resources to a school from a library or government center. A student could obtain references from a statewide university or regional library. These changes in school curriculum will make for the provision of a resource media technologist to maintain hardware and software and provide assistance for staff and students in using CAI/CMI materials. As this process impacts on school curriculum, it also needs provision for varying or flexible spaces to work on terminals and also to evaluate materials after completing a project. The

university space in a computer lab to work on terminals with adjacent spaces for quiet study or debugging programs may be appropriate for high schools as well. Many high schools are modifying these spaces to accommodate more flexible needs.

Greater space should be allocated in media/library centers of elementary and middle schools for computer learning centers. Harware and software storage requirements need to be considered within the media/library center or classroom areas. Within the school design, allocations should be made for adequate electrical hookups, preferably at the height of the machines and also to sustain any large surges or lack of power. There should be adequate control of temperatures (air conditioning or heat) to maintain the life of hardware and software. The machines put out a certain degree of heat themselves, which should be considered in temperature control. Provision should be made for excellent overhead lighting with constant eye contact. Dust from chalkboards must also be eliminated from the area. As the space is allocated for a networking system or converted to individual usage for computers, it should be able to be changed to provide flexible space forprogramming and also an adjacent study or quiet area. The need in future school facility design is determined by assessing these provisions of

computer usage as they relate to the intended changes in curriculum development. Much of the facility design also may depend upon close association of elementary, middle (junior high), high school, junior college, and university needs as they combine resources to provide a computer/technology program.

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